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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/016,595 | 12/07/2001 | David S. Soane | 50225-8011.US02 | 6546 |

22918 7590 08/14/2003

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| EXAMINER |
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HARAN, JOHN T

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| ART UNIT | PAPER NUMBER |
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1733

DATE MAILED: 08/14/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/016,595

Applicant(s)

SOANE ET AL.

Examiner

John T. Haran

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14, 15, 18, 19, 22, 25, and 27-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14, 15, 18, 19, 22, 25 and 27-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This action is in response to the amendment filed on 6/16/03. All previous rejections are withdrawn in light of the amendments to the claims.

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 6/16/03 has been considered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 depends on cancelled claim 17.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 14, 15, 18, 19, 22, 25, and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brackett (U.S. Patent 4,875,956) in view of Parce et al (U.S. Patent 5,885,470).

Brackett is directed to a method of making a fluidic module wherein a first and second sheet of acrylic plastic substrate with planar surfaces, one which includes a structure in the surface, are apposed to one another and heated to 300 degrees Fahrenheit under pressure so that molecules at the interface of the acrylic substrates transmigrate to form a morphological bond. It is noted that the glass transition temperature of acrylic is 100 degrees Celsius (212 degrees Fahrenheit), as noted in the Modern Plastics Encyclopedia, so the acrylic is heated above the glass transition temperature. Brackett is silent towards the structures being microstructures.

It is notoriously well known and conventional in the fluidic module art to have microfluidic modules that contain microstructures, as shown for example in Parce et al (Column 2, lines 63-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form microfluidic modules from substrates with microstructures, as is conventional in the art as evidenced by Parce et al, in the method of Brackett.

It is noted that support for the limitation of "heating the planar surface of the apposed first and second plastic substrates above their glass transition temperature for a time sufficient to allow the polymer molecules to interpenetrate the two apposed surfaces and create a morphological bond" only goes back to 6/18/97 in application 08/878,437, now U.S. Patent 6,176,962.

Regarding claims 15 and 30, Brackett teaches applying positive pressure with a mechanical fixture during bonding (See Figure 3).

Regarding claims 18 and 19, Brackett teaches enclosing the structures in a leak proof enclosure.

Regarding claims 22 and 25, it is well known and conventional for microstructures to be microchannels having a cross sectional dimensions between about 1um and 500um and for there to be intersecting microchannels, as shown for example in Parce (Column 2, lines 63-65) and it would have been obvious to do so in the method of Brackett, as modified above.

Regarding claim 27, one skilled in the art would have readily appreciated heating the substrates only as much as necessary to cause the molecules to transmigrate to eliminate unnecessary use of energy. Furthermore one skilled in the art would have readily appreciated that this temperature would have been dependent upon a variety of factors including the material worked upon. It would have been within the purview of one skilled in the art to only heat the substrates to a temperature 2 to 5 degrees Celsius above the glass transition temperature.

Regarding claim 28, one skilled in the art would have readily appreciated progressive heating of the substrates in order to avoid any thermal stresses and it would have been obvious to do so in the method of Brackett, as modified above.

Regarding claim 29, Brackett teaches cooling after heating and it would have been obvious to reduce the temperature slowly in order to avoid any thermal stresses.

Regarding claim 31, polymethylmethacrylate is a well known and conventional material for microfluidic devices, as shown for example in Parce et al (Column 5, line

65), and it would have been obvious to use conventional materials in the method of Brackett.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(703) 305-0052**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



John T. Haran

August 11, 2003



Michael W. Ball

Supervisory Patent Examiner
Technology Center 1700